

1. EP 860 417 has been removed as prior art in view of the declaration under 37 CFR 1.132 filed 07/20/2005 and a verified translation of Japanese priority document no. 11-002955.
2. The art rejections over EP 864 631 in view of Kawasumi have been overcome in view of the declaration under 37 CFR 1.132 filed 07/20/2005 and a verified translation of Japanese priority document no. 11-002955.
3. The art rejections over Shimizu in view of Fujumura have been withdrawn because Shimizu's information recording medium requires a photoconductive layer which is not part of the claimed invention.
4. Rejection of claim 23 over Kawasumi et al (US 5,645,758) in view of EP 763 532 is maintained.
5. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 05/22/2007 prompted the new ground(s) of rejection presented in this Office action.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
7. Claim 23 is rejected under 35 U.S.C. 103(a) as being obvious over Kawasumi et al (US 5,645,758) in view of EP 763 532. Kawasumi discloses an optical recording

medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi teaches the electrodes made from ITO which is transparent to light. Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Kawasumi does not disclose the use of the liquid crystal as set forth in the claims. EP '532, however, teaches an optical sensor comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for the liquid crystal material motivated by the desire to provide excellent in high-quality charge transport capability and higher durability.

Since the device of Kawasumi as modified by EP '532 comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase

in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

8. The art rejections over Kawasumi have been maintained for the following reasons.

The claims do not preclude the liquid crystal material from having a second substance dispersed therein for effectively forming liquid crystal domains. The "consisting of" is not sufficient to remove Kawasumi as prior art.

9. Claims 13, and 16-22 are rejected under 35 U.S.C. 103(a) as being obvious over JP 61-280046 in view of EP 763 532 and Kawasumi et al (US 5,645,758). JP'046 discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes. The information is recorded by using high density energy light. JP'046 does not specifically disclose a thickness of a gap between the electrodes. Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the liquid crystal material having a thickness as taught by Kawasumi motivated by the desire to provide the optical recording medium with a high speed response characteristics.

JP'046 does not disclose the use of the liquid crystal as set forth in the claims. EP '532, however, teaches an optical sensor comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape and charge

transport property would be inherently present as like material has like property.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for the liquid crystal material motivated by the desire to provide excellent in high-quality charge transport capability and higher durability.

Since the device of JP'064 as modified by Kawasumi and EP '532 comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being obvious over JP 61-280046 in view of Kawasumi et al (US 5,645,758). JP'046 discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes. The information is recorded by using high density energy light. JP'046 does not specifically disclose a thickness of a gap between the electrodes. Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the liquid crystal material having a

thickness as taught by Kawasumi motivated by the desire to provide the optical recording medium with a high speed response characteristics.

Since the device of JP'064 as modified by Kawasumi comprises the same liquid crystal material and the gap between the electrodes having a thickness within the range as disclosed in the present specification, it is the examiner's position that the thickness of the gap between the electrodes would be inherently smaller than a domain size of the liquid crystal compound in a cooled state from the isotropic phase in a final state. It seems from the claim, if one meets the structure recited, the properties must be met or Applicant's claim is incomplete.

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being obvious over JP 09-185043 in view of EP 763 532. JP'043 discloses an optical device comprising a substrate, a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (abstract). JP'043 teaches the electrodes made from ITO which is transparent to light (paragraph 38). The information is recorded by using laser head (paragraph 50). The gap between the electrodes having a thickness of 10 to 30 microns is within the range as disclosed in the present specification (paragraph 32). JP'043 does not disclose the use of the liquid crystal having a rod shape. EP '532, however, teaches an optical sensor comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape, charge transport property and relative thickness of the gap between the electrodes and domain size of the liquid

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crystal material would be inherently present as like material has like property.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for the liquid crystal material motivated by the desire to provide excellent in high-quality charge transport capability and higher durability.

### ***Double Patenting***

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 13, 16, 17 and 19-23 are rejected on the ground of nonstatutory

obviousness-type double patenting as being unpatentable over claims 1-13 of U.S.

Patent No. 6,174,455 in view of Kawasumi et al (US 5,645,758).

The '455 patent teaches a space light modulating device comprising a liquid crystalline charge transfer material. The '455 patent discloses the liquid crystal material comprising 2-(4'-octylphenyl)-6-dodecyloxynaphthalene. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. The '455 patent does not teach a particular structure of the space light modulating device. Kawasumi, however, discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the space light modulating device having a gap between the electrodes with a thickness as described by Kawasumi motivated by the desire to provide the optical shutter with a high-speed response characteristics.

14. Claim 18 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,174,455 in view of Kawasumi et al (US 5,645,758) as applied to claim 1 above, further in view of EP 763 532. The '455 patent does not specifically disclose a liquid crystal material comprising 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. EP 763 532, however, teaches a space light modulator comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes

(figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for 2-(4'-octylphenyl)-6-dodecyloxynaphthalene since two compounds have been shown in the art to be recognized equivalent liquid crystal materials for use in space light modulators.

15. Claims 13, 16, 17 and 19-23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,720,039 in view of Kawasumi et al (US 5,645,758).

The '039 patent teaches a space light modulating device comprising a liquid crystalline charge transfer material. The '039 patent discloses the liquid crystal material comprising 2-(4'-octylphenyl)-6-dodecyloxynaphthalene. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. The '039 patent does not teach a particular structure of the space light modulating device. Kawasumi, however, discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the space light modulating device having a gap between the electrodes with a thickness as described by



Kawasumi motivated by the desire to provide the optical shutter with a high-speed response characteristics.

16. Claim 18 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,720,039 in view of Kawasumi et al (US 5,645,758) as applied to claim 1 above, further in view of EP 763 532. The '455 patent does not specifically disclose a liquid crystal material comprising 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. EP 763 532, however, teaches a space light modulator comprising a pair of electrodes, a liquid crystalline charge transfer material filled into a gap between the electrodes (figure 1). EP'532 teaches the liquid crystal material made from 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole for 2-(4'-octylphenyl)-6-dodecyloxynaphthalene since two compounds have been shown in the art to be recognized equivalent liquid crystal materials for use in space light modulators.
17. Claims 13 and 16-23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. US 6,224,787 in view of Kawasumi et al (US 5,645,758).

The '787 patent teaches an optical sensor comprising a liquid crystal material such as 2-(4'-octylphenyl)-6-dodecyloxynaphthalene and 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. The '787 patent does

not specifically disclose a particular structure of an optical sensor and a thickness of the gap between the electrodes. Kawasumi, however, discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The information is recorded by using laser head (column 36, lines 39-41). Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the information recording medium having a gap between the electrodes with a thickness as described by Kawasumi motivated by the desire to provide the optical shutter with a high-speed response characteristics.

18. Claims 13 and 16-23 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. US 6,218,061 in view of Kawasumi et al (US 5,645,758).

The '061 patent teaches an optical sensor comprising a liquid crystal material such as 2-(4'-octylphenyl)-6-dodecyloxynaphthalene and 2-(4'-heptyloxyphenyl)-6-dodecylthiobenzothiazole. Likewise, the rod-shape and charge transport property would be inherently present as like material has like property. The '061 patent does not specifically disclose a particular structure of an optical sensor and a thickness of the gap between the electrodes. Kawasumi, however, discloses an optical recording medium comprising a substrate, a pair of electrodes, a liquid crystal material filled into a gap between the electrodes as shown in figure 103. The

information is recorded by using laser head (column 36, lines 39-41). Kawasumi discloses a gap between the electrodes having a thickness of 12 microns within the range as disclosed in the present specification (example 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the information recording medium having a gap between the electrodes with a thickness as described by Kawasumi motivated by the desire to provide the optical shutter with a high-speed response characteristics.

***Conclusion***

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485.

The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HV

/Hai Vo/  
Primary Examiner, Art Unit 1794